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Riccia Beyrichiana and *Riccia dictyospora*

BY MARSHALL A. HOWE

In the course of some remarks at the meeting of the Torrey Botanical Club held on December 11, 1900, the writer made allusion to the probable rediscovery at Athens, Georgia, by Mr. R. M. Harper, of *Riccia Beyrichiana*—a species which is alleged to have been discovered in this country about seventy years ago by Herr Beyrich and has of late been a subject of considerable doubt inasmuch as nothing apparently like it had been met with since. It was our intention, as expressed to some at the time, to secure, if possible, a portion of Beyrich's original plant before publishing any notes on Mr. Harper's specimens, in order that the determination might not rest upon description alone. In the original description nothing at all is said of the spores, from which, in this genus, important specific characters are now drawn. Three years ago, Herr Franz Stephani gave a new diagnosis of the species, including an account of the spores, but this description was in a few respects somewhat out of harmony with Mr. Harper's plants and increased the desire on our part to see the specimens of Beyrich's own collecting. A loan of the desired original from the Lindenberg herbarium, now preserved in the Naturhistorisches Hofmuseum at Vienna, has recently been obtained through the courtesy of Dr. A. Zahlbruckner. And a careful comparison of Beyrich's plant with that of Mr. Harper has led to the unexpected conviction that the two plants are absolutely distinct from each other.

Some further reference to the brief history of *Riccia Beyrichiana* may be of interest at this point. The species was originally described in Lehmann's "Novarum et minus cognitarum Stirpium Pugillus Septimus," published in Hamburg in 1838. Like several other parts of this work, the seventh Pugillus contains the diagnoses of numerous new Hepaticae, diagnoses which are commonly ascribed to the joint authorship of Lehmann and Lindenberg though it is occasionally suspected that Lindenberg

was chiefly responsible for them. The fact that Lindenberg had already, only two years before, published his classical "Monographie der Riccien" makes it very probable that this *Riccia*, at least, would have received his special attention. *Riccia Beyrichiana* was, however, a MS. name of Hampe's under which, as it would seem, Hampe had communicated the plant to one or the other of the authors of the work. It is stated in connection with the first description that the plant was collected by C. Beyrich in North America, between Jefferson and Gainesville, there being no intimation as to what part of North America these two towns might be found in. But from what is known of Beyrich's travels and of American geography, it is evident that the Jefferson and Gainesville in question are in northern Georgia, where these two towns are county-seats, lying fifteen or twenty miles apart. Jefferson, by the way, is, according to Mr. Harper, less than twenty miles from Athens, where the plant recently suspected to be *R. Beyrichiana* was collected. To return to our bibliographical sketch, an abridged description of the species, a few years after its publication, was included in the Synopsis Hepaticarum of Gottsche, Lindenberg, and Nees, and then, in 1856, an English abstract of this was given a place by Sullivant in the second edition of Gray's Manual. In some unaccountable way, Sullivant ascribed the plant to Tennessee. In Professor Underwood's "Descriptive Catalog of the North American Hepaticae," published in 1884, the species was treated much as by Sullivant, though with more reference to the original description. But in some critical notes on the American species of *Riccia* published by Professor Underwood in the Botanical Gazette in 1884, *Riccia Beyrichiana* was omitted on the ground that there was no recent evidence that it was a member of our flora.

In 1898, however, Herr Stephani, in his Species Hepaticarum, states that he has seen Beyrich's plant, that it was collected in Jefferson, North America, and that it is doubtless a good species. And he gives a new and somewhat detailed description of it. After an examination of the Lindenbergian material, we concur with Herr Stephani in the opinion that *Riccia Beyrichiana* is a valid species. The pocket in the Lindenberg herbarium is marked clearly "Int. Jefferson & Gainsville, 13/8 33. Beyrich. Mis.

Hampe 1837," and in view of the little attention which the collection of the *Ricciae* has as yet received in this country it seems to us that it is too early to suspect that everything in this connection is not just, as it purports to be. Herr Stephani's description* leaves little to be desired outside of a more detailed account of the spores, which we have supplied below in course of comparison with Mr. Harper's plant. The specimens collected by Mr. Harper represent, we believe, a hitherto unrecognized species which we would characterize as follows :

***Riccia dictyospora* sp. nov.**

Thallus simple or once dichotomous, forming irregularly gregarious patches, finally oblong or elongate-obovate, rarely sublinear, 4-10 mm. \times 1-2 mm., reticulate above, light green (when dry) with at length a narrow dark-purple border; median sulcus acute and somewhat pronounced toward the apex; ventral scales entire, purple at maturity, slightly exceeding the thin submembranous ascending thallus-margins; width of transverse sections of the thallus 1.5-3 times their height, the ventral outline rounded-convex or somewhat flattened, air-canals narrow and vertical, special cells densely filled with a yellowish granular substance ("oil-body" cells) usually abundant: primary epidermal cells oval-papilliform, soon collapsing, leaving more or less persistent cup-like vestiges: monoicous: antheridial ostioles not elevated: spores brown, rather translucent, soon exposed by the rupture of the overlying parts, 95-116 μ in maximum diameter, scarcely angled, somewhat flattened, wholly destitute of wing-margins, almost uniformly areolate over entire surface, in optical section appearing densely beset on all sides with short truncate spines or papillae; areolae of the outer face 8-12 μ in width, often less perfect in the middle of the face; areolae of the inner faces so similar to those of the outer as not to be readily distinguished at first sight, yet slightly larger and less regular, with somewhat less elevated boundaries.

On moist granite rock near Oconee River, Athens, Georgia (alt. 183 m.), Roland M. Harper, June 26, 1900, no. 68a.

In *Riccia dictyospora* the markings of the spore-wall are developed over its entire surface with a rare uniformity, the areolae being carried over the rounded scarcely perceptible wingless angles with little interruption. That there is, however, a difference in the

* Bull. Herb. Boiss 6: 318. 1898.

development of the inner and outer faces becomes especially apparent when these faces are compared in profile. The spines or papillae of the outer face are then seen to be considerably longer, projecting 6–9 μ , while those of the inner faces project only 4 or 5 μ .

Riccia Beyrichiana, with which, on account of its dark purple lower surface and the geographical association, *Riccia dictyospora* is perhaps most likely to be confused, is a considerably smaller plant* with thick rounded-obtuse, or, at the thallus-apex, merely acute, margins, which occasionally bear short cilia. In *R. dictyospora*, on the other hand, the thallus-margins are thin and submembranous and no cilia have been seen. But more striking distinctive characters are to be found in the spores. In *Riccia Beyrichiana* the mature spores are so extremely opaque that very little can be made of their surface-markings until they have been well saturated with glycerine after having been soaked out in water. It is nevertheless seen at once that they are distinctly angular, though often flattened or irregular in form, and that they are very large, measuring 116–140 μ in maximum diameter. In glycerine it can be determined that the inner faces are almost absolutely smooth, being roughened only by very fine granulations or sometimes by a faint suggestion of areolae. The outer face bears areolae which are 15–20 μ in diameter—much larger than in *R. dictyospora*. The boundaries of these areolae are less elevated than in many species of *Riccia* and the outer face as a rule appears rather obscurely papillate, yet in profile view it sometimes exhibits papillae 4 or 5 μ in length. The seams or wings at the angles of the spore are often narrow and obscure, but they sometimes broaden here and there into expansions 6–8 μ in width. It is possible that the opacity of the spores of Beyrich's plant has slightly increased during the many years of preservation, but age can be in no way responsible for the

* None of the specimens that we have seen from the Lindenberg herbarium is more than 5 mm. long and when soaked out they measure only .6–.8 mm. in width, though it is probable that after nearly seventy years of drying they do not quite regain their former dimensions. In regard to length, however, it is to be noted that Lehmann and Lindenberg in the original diagnosis (Lehm. Pugill. 7 : 1. 1838) describe the "fronds" as "2–4 lineares," while Stephani (*l. c.*) has recently described them as "usque 10 mm." The antheridia of *Riccia Beyrichiana* we have not seen, paucity of material standing in the way of extended search, so we are unable either to confirm or deny Stephani's statement that the species is monoicous.

other important characters which distinguish the spores of *Riccia Beyrichiana* from those of *R. dictyospora*. Age has not made the mature spores of *Riccia Beyrichiana* the more angular, it has not increased their size, it has not left more or less of a wing at their angles, it has not smoothed off their inner faces, and it has not doubled the diameter of the meshes of the outer face.

We do not know of any *Riccia* hitherto published which seems very closely allied to *R. dictyospora*. Among American species, *Riccia Americana* and *R. Austini* resemble it in the entire absence of wing-margins to the spores but in other respects have little in common with our plant.

Riccia Beyrichiana apparently remains a species unknown except from the original collection of August 13, 1833. It is to be hoped that botanists resident in the Southern States and those traveling in that region will consider its rediscovery a problem worthy of their attention.

COLUMBIA UNIVERSITY, 11 February, 1901.